

THE GENUS *DOSINIA* AND ITS SUBDIVISIONS.

By A. J. JUKES-BROWNE, F.R.S., F.G.S.

Read 12th April, 1912.

THE genus *Dosinia* includes a large number of species, and these vary considerably both in external and internal characters. It is by no means the compact genus that the definitions given by Woodward, Adams, and Fischer would lead one to suppose, for these definitions do not apply to all the species.

In his *Catalogue of the Conchifera or Bivalve Shells in the British Museum*, Part I, Veneridæ, etc. (1853), Deshayes enumerated 85 species; Adams described several new species in 1855; Römer again recorded others in 1860 and 1862, so that his monograph on *Dosinia* (published in 1862) contains the names and descriptions of 105 species, notwithstanding the fact that he united some of the forms which had been described under different names.

In such an assemblage of species it is only likely that differentiation should have produced several natural groups, and it is not surprising to find that several authors have arranged the species in a number of sections. Sowerby and Deshayes grouped them solely by the different characters of the dorsal border, but though the importance of these may be admitted, reliance on any one such set of characters does not lead to a very natural arrangement. Sowerby made seven such groups or sections, while Deshayes was content with five, which he defined in Latin as follows:—

1. Margine dorsali integro. [No escutcheon.]
 - (1) Striæ simplices.
 - (2) Striæ ad latera scabræ vel lamellosæ.
2. Margine dorsali circumscripto. [A defined escutcheon.]
 - (3) Area dorsali in medio prominente.
 - (4) Area dorsali depressa, plana.
 - (5) Area dorsali excavata.

Römer in his monograph objects to Sowerby's divisions as being unnatural, and himself proposes a series of eleven sections, but these are no more natural or satisfactory than those made by Sowerby and Deshayes. Moreover, he gave no definitions of his sections, merely indicating them by the name of a typical species, his groups being as follows:—

- | | |
|-----------------------------------|-------------------------------|
| 1. Sectio <i>D. concentricæ</i> . | 7. Sectio <i>D. juvenis</i> . |
| 2. „ <i>D. excisæ</i> . | 8. „ <i>D. scabriusculæ</i> . |
| 3. „ <i>D. isocardiæ</i> . | 9. „ <i>D. angulosæ</i> . |
| 4. „ <i>D. prostratæ</i> . | 10. „ <i>D. Brugueri</i> . |
| 5. „ <i>D. exoletæ</i> . | 11. „ <i>D. lucinalis</i> . |
| 6. „ <i>D. Africanæ</i> . | |

The first of these sections is practically the same as those of Sowerby and Deshayes, and is undoubtedly a natural group. The second is also a natural assemblage of peculiar species which I have classed as

a sub-genus under the name of *Sinodia*. His *isocardia* group is quite too restricted, including only that species, *D. lupinus*, and *D. modesta*, the last being probably only a variety of *lupinus*. None of his other groups are satisfactory, and it is often difficult to understand his reasons for associating or separating certain species. Thus he puts *lineta* in the *exoleta* section and *Africana* in another one (No. 6), whereas, in reality, *lineta* and *Africana* are so closely allied that some consider the latter to be only a variety of the former.

I cannot find that anyone else dealt systematically with the genus between the years 1862 and 1902, but in the latter year Dr. W. H. Dall published a "Synopsis of the Veneridæ",¹ and under the head of *Dosinia* he definitely proposed six sections, each with a special name, in addition to the group represented by the type species, *D. Africana*. As most of these are additions to conchological nomenclature, they must be critically examined in order to ascertain what other species besides the one selected as a type should be referred to each section; further, whether all the known species of *Dosinia* can be distributed among these sections. Their names and types are as follows:—

<i>Dosinia</i> , sensu stricto.	Type, <i>D. Africana</i> (Gray).
<i>Orbiculus</i> , Megerle.	,, <i>D. exoleta</i> (Lin.).
<i>Austrodosinia</i> , Dall.	,, <i>D. anus</i> (Phil.).
<i>Dosinisca</i> , Dall.	,, <i>D. alata</i> (Reeve).
<i>Dosinorbis</i> , Dall.	,, <i>D. bilunulata</i> (Gray).
<i>Dosinidia</i> , Dall.	,, <i>D. concentrica</i> (Born).
<i>Dosinella</i> , Dall.	,, <i>D. angulosa</i> (Phil.).

The principal characters of the type section (*Dosinia*, s.s.) as defined by Dr. Dall are—"Lunule impressed small, escutcheon narrow, elongate, bordered on each side by a ridge or keel; middle cardinals often grooved . . . ; pallial sinus angular, ascending, usually narrow and extended forward at least halfway from the posterior to the anterior adductor." He further remarks that "the form of the escutcheon differs in this group from an obscure flattening, often unequal in the two valves, to a distinctly keeled area with sculpture differing from that outside the boundary, but in the series of species almost every gradation between these forms may be observed". No mention, however, is made of any of the species he would refer to the group; but under *Orbiculus* he remarks that *D. prostrata* (Linn.) is a typical *Dosinia*, a view with which I cannot agree unless he intended also to include *D. Japonica*, *D. scabriuscula*, and other species hereafter noted.

It is conceivable that he meant to accept Römer's "Section of *D. Africana*", but if so he should have said so, for that section exhibits some obvious inconsistencies, including as it does *D. fibula*, but not *D. cretacea*, and excluding *D. lineta*, which is so closely allied to *D. Africana*. All these species certainly belong to this section as well as *D. Adansoni*, *D. Orbignyi*, and *D. alta*. Probably also *D. lupinus*

¹ Proc. U.S. National Museum, vol. xxvi, p. 335, 1902.

should be referred to it, but *D. hepatica* should not, because its lunule is not impressed, and it has no escutcheon. One wonders whether he would include such shells as *D. carulea* and *D. subrosea*, which agree with his wide definition except in regard to their pallial sinus, which is short, broad, and nearly horizontal, not ascending.

His *Orbiculus* section he briefly defines as follows: "There is no escutcheon, the pallial sinus is very long and narrow, and the anterior lateral is strong." As a matter of fact the anterior lateral is no stronger in *D. exoleta* than it is in *D. lineta*, while the middle cardinal of the left valve shows differences which Dr. Dall failed to perceive or to think of any importance.

I have elsewhere pointed out that under the present rules of zoological nomenclature Da Costa's genus *Pectunculus* must be recognized, and I selected his *P. capillaceus* (*Dosinia exoleta*) as the most convenient type. Hence the name *Orbiculus* must give place to *Pectunculus*. The *D. exoleta* group is easy to recognize as a natural section; it includes *D. radiata*, Sow. (which is probably only a West African variety of *exoleta*), *D. erythræa*, Römer, *D. amphidesmoides*, Reeve, *D. grata*, Desh., *D. nobilis*, Desh., *D. hepatica*, Lam., and *D. sculpta*, Hanley, with probably *D. conglobata*, Römer, though I have not seen a specimen of that species.

Dosinidia.—This section appears to represent the preceding group on American coasts, but differs from *Pectunculus* in the bright shining white surface of the shells, the sculpture being of flattened riblets separated by grooves, and in having a short angular pallial sinus. Dr. Dall also notes that in the nepionic young the posterior cardinal teeth are serrate or corrugated, though generally smooth in the adult; in *D. Dunkeri*, however, this condition sometimes persists, and I have a specimen in which it is clearly seen.

This section includes *D. concentrica* (Born), type; *D. elegans*, Conrad; *D. discus*, Reeve; *D. ponderosa*, Gray; *D. distans*, Sow. (if distinct from *ponderosa*); *D. Dunkeri*, Phil.; *D. Annæ*, Carp.; *D. nitens*, Reeve; which, however, is probably only a synonym of *D. Patagonica*, Phil. It must also include *D. plana* of Chinese waters, which is closely allied to *discus*, and consequently the section is not restricted to American seas as stated by Dr. Dall. *D. plana* and *D. discus* are the two most compressed and flattened species of the genus. *D. Hanleyana* (= *D. simplex*, Hanley) also probably belongs to this section, and is found at Singapore and in the Gulf of Siam.

Austrodosinia.—For this section Dr. Dall chose *D. anus* as his type, and he defined it as having the "lunule deeply impressed, escutcheon impressed and bordered by prominent keels; pallial sinus short and angular; anterior lateral and the pit into which it is received, and some of the anterior cardinal teeth sharply corrugated; the middle cardinals bifid". This description, however, is hardly correct, for the escutcheon of *D. anus* is only well defined in the left valve, the concentric riblets of the right valve being continuous to the ligamental margin. It does not differ, in fact, from the escutcheon of many species belonging to the typical section. Again, the middle cardinal teeth are not bifid in adult shells, being merely rugose; in young shells the

left middle cardinal is grooved near the top, but that of the right is not bifid.

Dr. Dall states that "this group is represented in New Zealand and Japan", but what special Japanese species he would group with *anus* I cannot imagine, for *Japonica* is quite different, both as regards escutcheon and teeth. The fact is that *D. anus* has peculiarities which are shared by few other species, those which come nearest to it being in my opinion *D. histrio*, *D. variegata*, and *D. laminata*; but I should group in this section *D. juvenis*, *D. scalaris*, *D. Gruneri*, *D. carulea*, *D. Kraussi*, and *D. ferruginea*, which are similar in dentition and form of pallial sinus.

Dosinorbis.—It will be convenient to take this supposed section next, Dr. Dall having created it for a single species, *D. bilunulata*, which, he says, "appears to be unique in the genus." The only unique feature about this species is the so-called double lunule, for all its other characters are shared by *D. Japonica* and other species. Moreover, there is only one real lunule, the outer one being merely an area of the anterior border defined by a sudden interruption of the concentric riblets which ornament the shell; these terminate anteriorly in erect crests along a definite line, thus limiting an area which resembles that of the escutcheon; but it is not a lunule, only a peculiar feature of the surface sculpture. No good purpose can be served by separating a single species under the guise of a 'section' when its special characteristic is not correlated with other peculiarities, and is therefore merely a specific character.

Dosinisea.—In the definition of this section and in the choice of *D. alata* (Reeve) as its typical species, Dr. Dall has excelled himself. His definition is as follows: "Areas of the lunule and escutcheon pouting mesially, defined by a deep sulcus, forming a posterior wing which recalls *Phacooides* (= *Lucina*); sculpture of fine, rather distant sharp lamellæ, sometimes with radial striation; pallial sinus deep and angular." He adds this group is distributed in Australia and Japan.

Now there are several species of which the lunular and escutcheon areas may be said to pout mesially, but only two species have ever been represented as possessing a groove or sulcus on the posterior side; these are *D. lucinalis* (Lam.) and *D. alata* (Reeve). Of the first very little is known. Mr. E. A. Smith informs me that it was figured by Delessert,¹ and that the type is doubtless at Geneva; also that the delineator of Chenu's *Illustrations Conchyliologiques* seems to have had a specimen of the true *lucinalis* before him, though not the actual type. No one else seems to have seen a specimen, for though it is mentioned by Hanley and Römer they clearly did not know the shell.

Of *D. alata* I could learn nothing beyond the description given by Reeve, and so far as I could ascertain no private collector in England possessed a specimen. I then applied to Mr. E. A. Smith, who kindly informed me that the type of *D. alata* is in the British Museum, and that he regarded it as merely an abnormal specimen of *D. plana*, Reeve; the type of *alata* being identical with *plana* in every respect

¹ *Recueil coquilles de Lamarche*, pt. ix. figs. 2, a-c.

except in having the curious groove. He has never seen or heard of a second specimen. Thus Dr. Dall's *Dosinisca* is based on a freak or deformed specimen, and has no real existence, because there is no group possessing all the characters indicated in his definition. Whether a second similar deformity exists in the U.S. National Museum, or whether Dr. Dall carelessly adopted Reeve's species without making any inquiry, is only known to himself, but the name *Dosinisca* will have to be abandoned.

Dosinella.—Here, again, Dr. Dall separated a single species to constitute a section by itself; at least he evidently thought he was doing so, though I am of opinion that the species in question, *D. angulosa*, is only the extreme form of a small natural group, for which the name *Dosinella* may consequently be adopted.

The special characters of *D. angulosa* are stated by Dr. Dall in the following terms: "Valves sub-orbicular with a shallow, flattish lunule; the escutcheon narrow, flattish, hardly defined; pallid sinus ample, ascending, deep, bluntly rounded at the anterior end; anterior lateral and right posterior cardinal teeth absent or obsolete." He further explains that the peculiar sinus and the obsolescent teeth of this form led him, "after some hesitation, to separate it sectionally."

It would seem, therefore, that he was unacquainted with *D. Bruguieri* (Gray) and *D. penicillata* (Reeve), which have precisely the same form of sinus, and very small anterior lateral teeth; they have, in fact, all the same shell-characters except that of the obsolescent posterior left cardinal, for I presume that Dr. Dall really meant the *left* cardinal and not the *right* as printed.

In *D. penicillata*, which is an Australian and Philippine species, the anterior lateral tooth is obsolescent in the adult, though quite well developed in a young specimen sent me by Mr. E. J. Banfield from Dunk Island, Queensland. In *D. Bruguieri* this tooth is still obvious in full-grown shells, though small and low.

D. angulosa and *D. penicillata* are also characterized by the complete absence of the second posterior cardinal in the right valve of the adult shell, though it exists as a faint line in the young, and again this feature persists in the adult *D. Bruguieri*.

Thus the three species form a series with *angulosa* at one end and *Bruguieri* at the other. The *D. funiculata* of Römer is probably only a variety of *angulosa*, but the *D. corrugata* of Reeve may be a good species, and if Römer's fuller description of it is correct it also would appear to belong to this group. *D. dilecta* of Adams, from Siam (as figured by H. Lyngé¹), also appear to belong to *Dosinella*.

I have now reviewed all the sections proposed by Dr. Dall, and it will be seen that they are not all satisfactory natural groups. Four of them can stand, namely, *Orbiculus* (= *Pectunculus*), *Austrodosinia*, *Dosinidia*, and *Dosinella*, while *Dosinorbis* and *Dosinisca* should be dropped as useless. But there are a number of well-known species of *Dosinia* which cannot be referred to any of these sections, at any rate as I have interpreted them, nor do they belong to the typical (*Africana*)

¹ Man. Acad. Roy. Sc. et L. de Danemark, ser. VII, t. v, p. 100, 1909.

group. Some of these species I separated in 1908 under the name of *Sinodia* with *D. trigona* as type; others remain which must now be considered, and chief of these is the group which includes *D. Japonica*, Desh., and *D. scabriuscula* (Phil.).

For this group I propose the name *Phacosoma*, from φακος and σῆμα = lentil-body. This section I define as follows.

PHACOSOMA (sectio nova).

Type, *Dosinia Japonica*, Reeve.

Shell orbicular, convex; lunule deeply impressed; escutcheon rather wide and pouting mesially on each side of the ligament, defined by raised lamellose ridges. In the left valve a strong anterior lateral, generally rugose; a narrow tall anterior cardinal, an oblique median which is not bifid, but rugosely striated, and runs back so that its outer edge is nearly parallel to the posterior tooth. Pallial sinus fairly deep, angular, and generally horizontal. Margin of right valve grooved posteriorly.

To this section the following other species belong: *scabriuscula* (Phil.), *biscocta* (Reeve), *cærulea* (Reeve), *prostrata* (Linn.), *exasperata* (Phil.), *contusa* (Reeve), *pubescens* (Phil.), *labiosa* (Römer), *lamellata* (Reeve), *Roemeri* (Dunker), and *subroscu* (Gray). In this group I should also place *D. bilunulata* (Gray), which Dr. Dall separates as a section by itself.

With respect to the *Sinodia* group it differs so much from all the sections above mentioned that I regard it as a sub-genus, and now give a condensed description of it.

SINODIA, Jukes-Browne.

Type, *Dosinia trigona*, Reeve.

Shell trigonal, oval, or orbicular. Lunule non-existent, but part of the anterior side is circumscribed by a faintly impressed line. Escutcheon area not defined, but sometimes depressed. In the left valve the anterior lateral is strong and distant from the anterior cardinal; the middle cardinal is entire, solid, and equidistant from the other two, but united at the top to the anterior tooth. Both valves are grooved on the posterior margins, the right having a long deep groove, the left a shorter and shallower one. The pallial sinus is variable, but generally rather short and rounded.

Most of the species are trigonal, and all have an expanded anterior side; but *D. excisa* (Chem.) is sub-orbicular and *D. globa* (Melvill) is more completely orbicular, still in its hinge and other internal characters it resembles *trigona* and *sphaericula*.

CORDIOPSIS, Cossmann.

Lastly, there are some fossil species which I regard as belonging to the genus *Dosinia*, but which have been separated by M. Cossmann as a sub-genus of *Meretrix* under the name of *Cordiopsis*. The type of this group is a well-known Oligocene fossil, the *Cytherea incrassata* of Sowerby, which I referred to *Sinodia* in 1908, remarking that it agreed with *Sinodia* in all the points which I then mentioned, and

that it further resembled *Dosinia* in the thickness of the hinge-plate, in the rugosity of the anterior lateral tooth, and in the manner in which the right posterior cardinal springs from the end of the incurved anterior margin. It also agrees with *Dosinia* and with *Aphrodina* in the forward direction of the right anterior cardinal, which in *Pitaria* and in typical *Callista* is more directly transverse, and nearly parallel to the middle cardinal.

M. Cossmann, writing in 1909,¹ differs from me with regard to the affinities of this species, and remarks as follows (in French, which I translate): "*Cordiopsis* evidently belongs to *Meretrix* by its form, by its smooth surface, without a carinated escutcheon, and especially by the small tooth A II [the anterior lateral], which is always isolated from 2a" [the anterior cardinal]. He distinguishes it from *Pitaria* "by the disposition of its cardinal teeth, the form of its sinus, by its much more cordiform shape, and by the disappearance of A I and A II. He further remarks: On the other hand, it seems to us impossible to connect it with *Dosinia*, which is a genus well differentiated by its orbicular and flattened form, as well as by its narrow and pointed sinus, by its impressed lunule, by its grooved surface, etc."

Now the characters by which he connects *Cordiopsis* with *Meretrix* are of no value whatever, for *Venus incrassata* is not absolutely smooth and glossy like *Meretrix* and *Callista*, but is finely concentrically striated like *Pitaria* and many *Dosinie*. Again, the anterior lateral tooth of *V. incrassata* is pustular and tends to disappear with age, as in some species of *Dosinia*, whereas in *Meretrix* and *Callista* it is elongate, tall, and persistent.

Moreover, the points by which he tries to distinguish *Cordiopsis* from *Dosinia* show that he does not at all understand the real characteristics of that genus, the shells of which are not always flattened, the sinus is not always narrow and pointed, nor is the lunule always impressed. It is clear, in fact, that M. Cossmann's principles of classification differ from those of most modern conchologists in that he regards the external characters of the shell and the form of the pallial sinus as being of equal or greater importance than the characters of the hinge. I adhere to the prevalent view that the latter afford a much better and more constant criterion for distinguishing genera and sub-genera from one another than any other feature in Lamellibranch shells.

Comparing the type of *Cordiopsis* with that of *Sinodia* he says, "the contour of the hinge-plate is much more excavated and sinuous in *C. incrassata*, which when of the same size has a more remote (posterior lateral) tooth 3b, and a much deeper pit to receive A II, with two protuberances (A I and A III) which are not so noticeable in *Sinodia*." . . . "The polymorphic ontogeny of *Cordiopsis*, its cordiform aspect at all ages, its less developed and narrower sinns, make it certain that we cannot confuse it with *Sinodia*, if we do not rely exclusively on the single criterion of the hinge in the classification

¹ "Conchologie Néogénique de l'Aquitaine": Actes Soc. Lin. Bordeaux, t. lxiv, p. 387, 1910.

of sub-genera. It is for this reason that we admit *Sinodia* as a section distinct from *Cordiopsis*, of which it is the modern degenerate representative."

On the contrary, I am still of opinion that both *Sinodia* and *Cordiopsis* belong to the genus *Dosinia*, and are altogether distinct from *Meretrix*, though they are related to *Pitaria*. At the same time I admit that there are some differences between the two groups, and I am quite willing to accept M. Cossmann's separation of them; the more so as he is able to associate several Miocene and Pliocene species with *C. incrassata*. These are *Cyprina gigas* (Lam.), *C. islandioides* (Lam.), *Cordiopsis intercalaris* (Cossmann), and *Venus Brocchii* (Desh.) of the Italian Pliocene. M. Cossmann has figured the three French Miocene species in the memoir referred to, and they are evidently of the *C. incrassata* type. If, however, M. Cossmann means that he would place *Sinodia* as a section of *Cordiopsis* he runs contrary to accepted rules of nomenclature, for the name *Sinodia* has priority. *Cordiopsis* must be regarded either as a section of *Sinodia* or as a separate sub-genus of *Dosinia*.

Summary.—Hitherto I have dealt chiefly with the descriptions of sections and sub-genera given by other authors, and it will now be desirable to mention the characters which I regard as the most useful in distinguishing the subdivisions of *Dosinia* from one another, afterwards giving brief definitions of these subdivisions. The characters on which I rely are (1) the features of the lunule and escutcheon, (2) the teeth of the left valve, (3) the presence or absence of a 4th cardinal in the right valve, (4) the shape and depth of the pallial sinus, (5) the presence or absence of a groove on the posterior margin of the right valve, which receives a ridge on the rim of the left valve. These characters are more or less correlated with one another, and by them all the groups which have been mentioned may be defined in a satisfactory manner.

Dosinia (sensu stricto).—Lunule deeply impressed. Escutcheon narrow, more or less excavated, but often ill-defined. In the L.V. the anterior lateral is large and thick, middle cardinal broadly bifid, the front part being united at top to the anterior cardinal. In the R.V. there is a distinct 4th cardinal (long and narrow), and the posterior margin has a narrow and shallow groove. Pallial sinus long, narrow, obtuse or bluntly angular, and ascending.

Dosinella (Dall).—Lunule shallow and lanceolate. Escutcheon narrow and slightly excavated, but not well defined. In the L.V. the anterior lateral is small or obsolete, the middle cardinal broad and bifid, the front part being united at the top to the anterior cardinal. In the R.V. the 4th cardinal is absent or very weak, and there is no groove on the margin of the valve. The pallial sinus is deep, ascending, of nearly equal width throughout and rounded at the end.

Austrodosinia (Dall).—In this section the lunule is deeply impressed, but the escutcheon is narrow and ill-defined, though often bordered by ridges and sometimes excavated in the left valve. In the L.V. the anterior lateral is strong and rugose, the middle cardinal thick and solid, centrally placed between the other two. In the R.V. there

is a strong 4th cardinal, and the posterior margin is grooved. The pallial sinus is short and nearly horizontal, sometimes rounded and sometimes angular.

Phacosoma (Jukes-Browne).—This has been defined on p. 100; it is distinguished from *Austrodosinia* by the broad well-marked escutecheon and by the oblique median tooth of the left valve, between which and the anterior there is a wide triangular space. The pallial sinus is also deeper and is always angular.

Pectunculus (Da Costa).—Lunule moderately impressed. No escutecheon. In the L.V. a small anterior lateral near the anterior cardinal; the middle cardinal broad and obscurely bifid, the front part being united to the anterior tooth. In the R.V. the 4th cardinal is weak or obsolete; the posterior margin has a shallow groove which is often obsolete in adult shells. Pallial sinus deep, rounded or obtusely angular, and generally ascending.

Dosinidia (Dall).—Lunule very little impressed. No escutecheon. In the L.V. a small pustular anterior lateral close to anterior cardinal, middle cardinal broadly bifid and united to anterior tooth; posterior cardinal thin and weak. In the R.V. the 4th cardinal is distinct and sharp, the 3rd is deeply bifid and has an anterior expansion over the median; the marginal groove is absent (except in *Dunkeri* and *Annæ*). Pallial sinus fairly deep, ascending, and angular.

Sinodia (Jukes-Browne).—This has been sufficiently defined on p. 100.

Cordiopsis (Cossmann).—Shell orbicular, thick, generally tumid, with incurved umbones and cordiform frontal aspect. Lunule superficial. No escutecheon. In the left valve a small pustular anterior lateral which becomes obsolete with age; middle cardinal thick, central, rugose, and united at the top to anterior tooth. In R.V. there is no 4th cardinal, but the posterior margin is grooved. Pallial sinus very short, small, and rounded.

In conclusion, a few words about the geographical distribution of the recent species may be useful. Those of the typical section are restricted to the old world, ranging round the shores of Europe, Africa, and Asia, the most eastern species being *D. prostrata* and *D. exasperata*, which occur in the Philippine Islands and in North Australia. The species of *Dosinella* have a restricted distribution, *dilecta* coming from Malacca and Siam, *angulosa* from the East Indian Islands, Malacca, and the Philippines, *penicillata* is Australian, and *Bruguieri* ranges from Australia to Japan. *Austrodosinia* is also an eastern ocean group, the species ranging from the east coast of Africa to Australia, New Zealand, the Philippines, and Japan.

The *Phacosoma* section is essentially Japanese, no fewer than five species occurring in Japanese waters, but *lamellata* is Australian, while *pubescens* and *Rocmeri* are East African.

The *Pectunculus* section is distributed round the whole of Europe and Africa, but I cannot find that any occur on Asiatic coasts. There are, however, a number of species in Australian waters, viz. *amphidesmoides*, *grata*, *sculpta*, *nobilis*, and *incisa*.

The *Dosinidia* section is essentially American, occurring on both

sides of Central and South America, but it is also represented in Chinese seas by the species *plana* and *Hanleyana*.

Of the distribution of the *Sinodia* group little is yet known. *D. trigona* was supposed to occur in the Red Sea, but this has not been confirmed, while it has recently been obtained from Siam and Malacca. *D. tripla* and *D. derupta* are both reported by Römer as coming from Malacca. The home of *D. excisa* is said to be Tranquebar and the Nicobar Islands, and lastly *D. globa* was found in the Persian Gulf. Thus it would seem that all the species live on the coasts of Southern Asia.

To Mr. J. J. MacAndrew and Mr. J. C. Melvill I offer my sincere thanks for their kindness in sending many specimens from their collections for my examination, and I have also to thank Mr. E. A. Smith for his valuable assistance in the naming of specimens submitted to him, and for looking up the types of certain species in the British Museum.

ON THE GENERIC NAME TO BE APPLIED TO THE VENUS
ISLANDICA, LINN.

By E. A. SMITH, I.S.O.

Read 12th April, 1912.

A CONSIDERABLE amount of discussion has already taken place concerning the generic name which should be applied to the well-known *Cyprina Islandica*, the *Venus Islandica* of Linnæus, and the latest writer upon the subject, Dr. W. H. Dall,¹ has assigned this shell to the genus "*Cyclas* (Bruguière), Link".

Now Bruguière's plates in the *Encyclopédie Méthodique* (pls. 301, 302) with the word *Cyclas* at the top (he never published a description) do not include a figure of *Cyprina Islandica*, and the figures 1a, 1b, on plate 301, referred to by Dall as representing that species are very good illustrations of some form of the genus *Batissa*.

Dr. Dall's mistake may have arisen from the fact that in the explanation of the plates by Bory de St. Vincent,² the name *Cyprina Islandica*,³ Lamk., is given (erroneously) to the two figures quoted above. But of this I feel certain, that Dr. Dall did not actually see the figures, for he is too good a conchologist to have regarded them as representing the above-named species.

The genera figured on Bruguière's two plates are *Batissa*, *Corbicula*, *Cyrena*, and *Sphærium*, as now generally understood, and perhaps *Astarte*, but not *Cyprina*. Bruguière's genus *Cyclas* has therefore nothing to do with *Cyprina*.

Link, in 1807,⁴ placed the northern shell in "*Cyclus* (Lam.)", it being the only species he mentions. But this name cannot be used, as it had already been employed by Lamarck in 1799⁵ in a different sense for the *Tellina cornea*, Linn., now known as *Sphærium corneum*. The figure in the *Encyclopédie Méth.* (pl. 301, figs. 1a, 1b) upon which Dall based the genus "*Cyclas* (Bruguière), Link", does not, as already observed, represent the *Cyprina Islandica*.⁶ The form of the outline is quite different, and the erosion of the apex and the dentition at once indicate a species of the genus *Batissa*. Observe the crenulated lateral teeth in fig. 1b, a feature non-existent in *Cyprina Islandica*.

¹ Trans. Wagner Free Inst. Sci. Philad., vol. iii, pt. vi, p. 1500, 1903.

² Tabl. Encycl. Méthod. Vers. Moll., etc., p. 156.

³ Also quoted by Lamarck as *Cyclas Islandica*, Ann. Mus. Nat. Hist. Paris, vol. vii, p. 420, 1806.

⁴ Nat. Sammlung, Rostock, 1807, p. 150.

⁵ Mém. Soc. Hist. Nat. Paris, 1799, p. 84.

⁶ All the following authors refer to this figure as representing the shell now known as *Batissa violacea*: Deshayes (Encycl. Méth. Vers., vol. ii, p. 49, 1830) under *Cyrena violacea*, Lamk.; id. (Cat. Conch. Brit. Mus., pt. ii, p. 238) under *Batissa violacea* (Lamk.); Philippi (Conchylien. vol. iii, p. 108) under *Cyrena violacea*, Lamk.; Prime (Amer. Journ. Conch., vol. vii, p. 140) under *Batissa violacea* (Lamk.); Clessin (Conch. Cab., p. 208) under *B. violacea*.

On these two plates Bruguière grouped as *Cyclas* a number of freshwater shells, and even the figure 3 on plate 302, said by some to represent an *Astarte*, would equally answer for a *Corbicula*, and Deshayes¹ observes "elle serait plus probablement du genre Cyrène, puisque Bruguière l'a ainsi placée, mais comme elle ne montre pas la charnière, nous conservons du doute".

It now remains to determine what generic name should be applied to the shell in question.

The name *Arctica* of Schumacher (1817) has a year's priority of *Cyprina*, Lamarck, but, as pointed out by various writers, it was preoccupied by Moehring in 1758 for a genus of birds, and therefore is not available. Although *Cyprina*, Lamk., and *Cyprinus*, Linn. (a genus of fishes), are very similar, the derivations according to Agassiz,² Hermannsen,³ Philippi,⁴ Tryon,⁵ Fischer,⁶ Hoyle,⁷ etc., are different. Both therefore can be employed in zoological nomenclature.

The synonymy will therefore stand as follows:—

CYPRINA ISLANDICA (Linn.).

1767. *Venus*, Linn., part.
 1806. *Cyclas*, Lamk., part. (non *Cyclas*, Lamk., 1799 = *Sphaerium*, Scopoli, 1777).
 1807. *Cyclas*, Link. (non *Cyclas*, Lamk., 1799).
 1817. *Arctica*, Schumacher (non *Arctica*, Moehring, 1758).
 1818. *Cyprina*, Lamarck.
 1900. *Cypriniadea*, Rovereto.
 1903. *Cyclas* (Bruguière), Link, *vide* Dall (non *Cyclas*, Brug., 1798, nec *Cyclas*, Lam., 1799).

¹ Lamarck's Hist. Anim. sans Vert., 2nd ed., vol. vi, p. 275.

² Nomencl. Zool. Moll., p. 28; Vertebrata.

³ Indicis Gen. Malac., vol. i, p. 361.

⁴ Handbuch Conch. und Malac., p. 306.

⁵ Struct. and Syst. Conch., vol. iii, p. 187.

⁶ Man. Conchyl., p. 1070.

⁷ Journ. of Conch., vol. x, p. 361.